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ADSORPTION AGENT FOR THE CLEANING OF TEXTILES WITH ALIPHATIC HYDROCARBONS AND DEVICES FOR ITS USE

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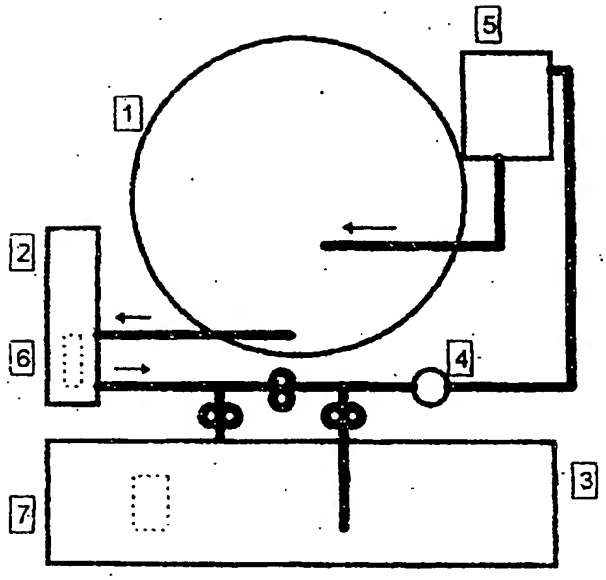
Combination of adsorption agents and devices for the removal of soluble foreign substances from solvents, which are used for the cleaning of textiles, characterized in that the solvents consist of aliphatic hydrocarbons with a flash point > 55°C and the adsorption agents consist of synthetically produced molecular sieves.



Regarding utility model application, File No. 299 21 805.a
Your letter of February 16, 2000

Adsorption agent for the cleaning of textiles with aliphatic hydrocarbons and devices for its use

Description

Textile cleaning with aliphatic hydrocarbon solvents (HCS) and the methods and devices used for its execution are, in fact, known, for example, from Patent Application No. P 43 19 177.0. Here, a method is described, which dispenses with the previously common distillation of the solvent for the purpose of its regeneration. The distillation frees the solvent of soluble foreign substances, whose boiling points are sufficiently far above that of the solvent.

In the method described at the time, which became the state of the art later for a branch of textile cleaning, suitable adsorbents are used for the adsorption of soluble foreign substances, for example, oils, fats, fatty acids, and dyes, from the solvent. The adsorbents are present in all customary products as a fine powder. In accordance with the description, they form a filter cake on the filter element, which must be disposed of after its exhaustion and thereby entrains a relatively large amount of solvent because of its structure. This state of the art has remained unchanged until now, even if the composition of the powdery filter aid differs according to the supplier.

The described method has the already mentioned disadvantage that it does not take place optimally, with respect to the aspects of avoiding waste and economizing resources. It is true that the considerable expenditure of energy for the continuous distillation of the solvent is omitted with it. This advantage, however, is cancelled, in part, in that considerable waste quantities are yielded in the form of the filter sludge. These filter residues are composed of spent adsorbent, solvent-insoluble soil cleaned off from the material cleaned, and solvent bound together in this

amorphous mass. The solvent removed from the cleaning process in this manner is too valuable, both commercially and ecologically, to be turned over to disposal.

The described method has a further disadvantage. The metering of the respective applied absorbent was left to the operator. Through the thereby possible excess metering, the amount wasted could be unnecessarily increased. Material and financial losses are the result. With insufficient metering, the quality of the solvent suffers and as a consequence the cleaning performance of the system [suffers as well].

The provided method describes, on the other hand, a manifold improvement of the state of the art. In accordance with the invention, an embodiment of the adsorbing substance--a suitable molecular sieve--is used as granulate, instead of the powder adsorbents offered at present. As a result of its inner structure, the granulate bed is able to absorb from the solvent, and bind most of the disturbing, soluble foreign materials, for example, oils, fats, fatty acids, and many dyes. The outer structure avoids the formation of sludge, in contrast to the powdery substances. Among one another, the relatively coarse particles form no capillaries, in which large solvent quantities are retained. In the disposal of the spent adsorbent granulate, therefore, a comparatively small amount of solvent is lost.

Other advantages of the form of the adsorbents, in accordance with the invention, are to be found in the type of devices for their use, also in accordance with the invention. The powdery products common at present require an enlarged filter surface, because of their use as a deposition layer on the filter (5), which was originally used in the cleaning unit only for filtering from the solvent of insoluble soiling components, cleaned off from the material to be cleaned. In order to ensure a good filter functioning, the active adsorbents are blended with inactive carrier material. The granulate form, in accordance with the invention, permits the use of 100% active materials--outside the filter (5). This can be designed smaller, in turn, if it still serves only its original purpose. The granulate is introduced, in accordance with the invention, in containers (6) and (7) with throughflow, whose volume is aimed at the solvent filling of the cleaning unit. These devices clearly fix the adsorbent quantity to be used. They thus reliably prevent expensive and ecologically disadvantageous excess metering and help avoid an erroneous insufficient metering at the same time.

The adsorbent containers with throughflow are located, in accordance with the invention, on two sites of the cleaning unit:

*In the flow area of the needle trap (2) in the full flow of the solvent circulation during the cleaning cycle of the unit.

*In the work tank (3) of the unit.

This arrangement, in accordance with the invention, aims at a double effect.

*The partial quantity of the adsorbent in (6) in the full flow of the solvent circulation acts directly on the quality of the solvent during the active cleaning phase--that is, during the contact of the solvent with the material to be cleaned. For economic reasons, this phase is limited to a short period of time, which, in accordance with experience, is not always enough for a sufficient regeneration of the solvent.

*For this reason, a second partial quantity of the adsorbent in the second container (7) with throughflow is introduced into the work tank of the unit. There, it has long-term contact with the solvent used. Practical testing has shown that the desired regeneration effect also occurs in the solvent at rest.

Only with some particularly intensive colorings of the solvent, which colorings take on a red-violet color tone, in accordance with experience, is the clarification effect of the granulate described not sufficient. In accordance with experience, a small quantity (ca. 0.05 wt% of the colored solvent quantity) of a special powdery adsorbent, a desired molecular sieve type, is metered directly into the solvent circulation in such cases. The powder form makes possible a spontaneous decolorizing effect. The adsorbent is retained on the circulation filter (5), like the insoluble impurities. The small amount does not appreciably burden the filter.

Claims

1. Combination of adsorption agents and devices for the removal of soluble foreign substances from solvents, which are used for the cleaning of textiles, characterized in that the solvents consist of aliphatic hydrocarbons with a flash point > 55°C, and the adsorption agent consists of synthetically produced molecular sieves.

2. Combination of adsorption agents and devices for the removal of soluble foreign substances from solvents, which are used for the cleaning of textiles according to Claim 1, characterized in that the adsorption agent component is shaped as granulate, for the removal of oils, fats, fatty acids, and many dyes.

3. Combination of adsorption agents and devices for the removal of soluble foreign substances from solvents, which are used for the cleaning of textiles according to Claims 1 and 2, characterized in that a second adsorption agent component is used for the removal of the typical red-violet colorings of the solvent, known to experts.

4. Combination of adsorption agents and devices for the removal of soluble foreign substances from solvents, which are used for the cleaning of textiles according to Claims 1 and 2, characterized in that the granulate-shaped adsorption agent component is introduced into containers (6) and (7) with throughflow.

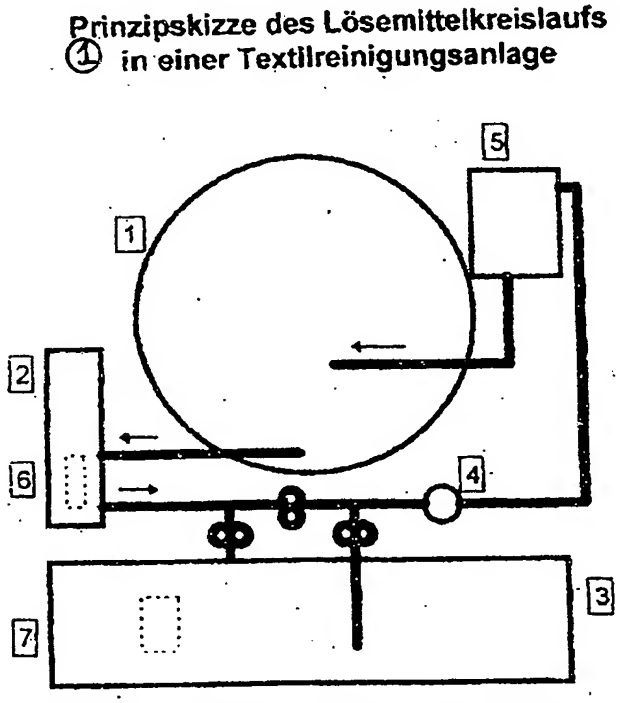
5. Combination of adsorption agents and devices for the removal of soluble foreign substances from solvents, which are used for the cleaning of textiles according to Claims 1, 2, and

4, characterized in that the containers (6) and (7) with throughflow are aimed at, in their volume, a defined ratio of the solvent volume.

6. Combination of adsorption agents and devices for the removal of soluble foreign substances from solvents which are used for the cleaning of textiles, in accordance with Claims 1, 2, 4, and 5, characterized in that a container with throughflow is introduced, with a partial quantity of granulate-shaped adsorption agent, into the full flow of the solvent circulation of the textile cleaning unit, preferably in the area of the needle trap, and in the work tank of the unit.

List of reference symbols

1 Work drum
2 Needle trap
3 Work tank
4 Circulation pump
5 Circulation filter
6 Granulate container 1
7 Granulate container 2



Key: 1 Schematic diagram of solvent circulation in a textile cleaning unit